

## IN THE CLAIMS

Claims 2, 3, 6, 36, and 38 are amended herein. Claims 1, 4, 5, 17, 18, 32-35, 37, and 39 are cancelled herein. Claims 19-31 and 40-65 were allowed All pending claims are reproduced below.

- 1        1. (CANCELED).
- 1        2. (CURRENTLY AMENDED) ~~The micro-switch of claim 1, A micro-switch,~~  
2 comprising:  
3        a first substrate and a second substrate bonded together to form a cavity;  
4        on the first substrate, at least one signal path that runs from inside the cavity to  
5        outside the cavity at at least two locations; and  
6        at least one movable structure on the second substrate, said movable structure  
7        comprising at least one conductive contact area, wherein at least one  
8        portion of said movable structure is inside said cavity, and the movable  
9        structure is moved in response to a force provided by an actuator,  
10        wherein a state of electrical contact of said micro-switch is changed by  
11        moving said movable structure, wherein said actuator is powered  
12        through at least one actuator drive line and at least one ground line,  
13        wherein said at least one actuator drive line and said at least one  
14        ground line run from inside said cavity to outside said cavity, said at  
15        least one actuator drive line being electrically connected to said  
16        actuator and said at least one ground line being electrically connected  
17        to an electrical common.
- 1        3. (CURRENTLY AMENDED) ~~The micro-switch of claim 1, A micro-switch,~~  
2 comprising:  
3        a first substrate and a second substrate bonded together to form a cavity;  
4        on the first substrate, at least one signal path that runs from inside the cavity to  
5        outside the cavity at at least two locations; and  
6        at least one movable structure on the second substrate, said movable structure  
7        comprising at least one conductive contact area, wherein at least one

8                   portion of said movable structure is inside said cavity, and the movable  
9                   structure is moved in response to a force provided by an actuator,  
10                  wherein a state of electrical contact of said micro-switch is changed by  
11                  moving said movable structure, wherein said movable structure is  
12                  selected from a list of movable structures consisting of: a cantilever  
13                  and a cantilever with at least one pedestal.

1                  4.        (CANCELED)

1                  5.        (CANCELED)

1                  6.        (CURRENTLY AMENDED) ~~The micro-switch of claim 1, A micro-switch,~~  
2                  comprising:

3                  a first substrate and a second substrate bonded together to form a cavity;  
4                  on the first substrate, at least one signal path that runs from inside the cavity to  
5                  outside the cavity at at least two locations; and  
6                  at least one movable structure on the second substrate, said movable structure  
7                  comprising at least one conductive contact area, wherein at least one  
8                  portion of said movable structure is inside said cavity, and the movable  
9                  structure is moved in response to a force provided by an actuator,  
10                 wherein a state of electrical contact of said micro-switch is changed by  
11                 moving said movable structure, wherein said first substrate and said  
12                 second substrate are bonded together with a gold thermocompression  
13                 bonding process.

1                  7.        (ORIGINAL) The micro-switch of claim 6, wherein said gold  
2                  thermocompression bonding process is performed below 400 degrees C during bonding.

1                  8.        (ORIGINAL) The micro-switch of claim 6, wherein said gold  
2                  thermocompression bonding process is performed without heating said substrates during  
3                  bonding.

1           9-16. (PREVIOUSLY CANCELED)

1           17. (CANCELED)

1           18. (CANCELED)

1           19. (PREVIOUSLY AMENDED) A lid assembly for a micro-switch comprising:  
2           a substrate;  
3           a first insulating layer formed on the substrate;  
4           a first conductive layer formed on the substrate;  
5           at least one signal path formed in the conductive layer;  
6           a second insulating layer formed on the first conductive layer;  
7           an insulating ring formed in the second insulating layer;  
8           a second conductive layer formed on the second insulating layer;  
9           a first conductive ring formed in the second conductive layer, the first  
10          conductive ring substantially aligned with and overlying the insulating  
11          ring;  
12          a second substrate having a second conductive ring at least partially  
13          surrounding a movable structure, the first conductive ring on the  
14          second conductive layer substantially aligned with and overlying the  
15          second conductive ring around the movable structure, thereby forming  
16          a seal around the movable structure when the lid assembly is bonded to  
17          the second substrate;  
18          at least two external signal contact points formed in the first conductive layer,  
19          said at least one signal path electrically connected to said at least two  
20          external signal contact points, and each contact point being outside the  
21          seal around the movable structure;  
22          an actuator formed in the first conductive layer for providing a force on a  
23          movable structure on the second substrate; and  
24          at least one actuator drive line formed in the first conductive layer electrically  
25          connected to the actuator.

1        20. (PREVIOUSLY AMENDED) A method of making a lid assembly for a micro-  
2 switch, the method comprising:  
3              forming a first insulating layer on a first substrate;  
4              forming a first conductive layer on the first substrate;  
5              forming at least one signal paths in the first conductive layer;  
6              forming at least two external signal contact points in the first conductive layer,  
7                  each electrically connected to said at least one signal path;  
8              forming an actuator in the first conductive layer for providing a force on a  
9                  movable structure on a second substrate;  
10             forming at least one actuator drive line in the first conductive layer electrically  
11                  connected to the actuator;  
12             forming a second insulating layer on the first conductive layer;  
13             forming an insulating ring in the second insulating layer;  
14             forming a second conductive layer on the second insulating layer;  
15             forming a first conductive ring around a movable structure on a second substrate;  
16             forming a second conductive ring in the second conductive layer, the second  
17                  conductive ring in the second conductive layer substantially aligned with  
18                  and overlying the insulating ring, the second conductive ring in the second  
19                  conductive layer also substantially aligned with and overlying the first  
20                  conductive ring around a moving structure on the second substrate; and  
21             bonding the first and second substrates together forming a sealed cavity and  
22                  thereby sealing the movable structure, wherein the at least one signal path  
23                  runs from inside the cavity to outside the cavity, and said at least one  
24                  signal paths that runs from inside to outside the cavity is connected to an  
25                  external signal contact point outside the cavity.

1        21. (PREVIOUSLY ADDED) The lid assembly for the micro-switch of claim 19,  
2 wherein said at least one signal path formed in the conductive layer further comprises:  
3              at least one gap separating said at least one signal path formed in the conductive  
4              layer into two electrically disconnected portions; and

5           in at least one state of electrical contact of said micro-switch, said movable structure  
6           electrically connecting said two electrically disconnected portions.

1       22. (PREVIOUSLY ADDED) The lid assembly for the micro-switch of claim 19,  
2       wherein said lid assembly includes at least one ground line that is electrically connected to an  
3       electrical common or ground.

1       23. (PREVIOUSLY ADDED) The lid assembly for the micro-switch of claim 19,  
2       wherein said micro-switch is a portion of a device selected from the list of portions of a  
3       device consisting of: phase shifter, power amplifier, antenna, low-noise amplifier, filter,  
4       inductor, and variable capacitor.

1       24. (PREVIOUSLY ADDED) The method of making a lid assembly for a micro-  
2       switch of claim 20, wherein said at least one signal path electrically connected to at least two  
3       external signal contact points further comprises:

4           at least one gap in said at least one signal path, separating said at least one signal  
5           path into two electrically-disconnected sections; and  
6           in one state of electrical connection of said micro-switch, said movable structure  
7           electrically connecting said two electrically-disconnected sections.

1       25. (PREVIOUSLY ADDED) The method of making a lid assembly for a micro-  
2       switch of claim 20, wherein said lid assembly further comprises at least one ground line that  
3       is electrically connected to an electrical ground or common.

1       26. (PREVIOUSLY ADDED) The method of making a lid assembly for a micro-  
2       switch of claim 20, wherein said micro-switch is a portion of a device selected from the list  
3       of portions of a device consisting of: phase shifter, power amplifier, antenna, low-noise  
4       amplifier, filter, inductor, and variable capacitor.

1       27. (PREVIOUSLY ADDED) A method of making a lid assembly for a micro-switch,  
2       the method comprising:  
3           forming a first substrate with an insulating surface;  
4           forming a first conductive layer on said insulating surface;

5 forming at least two signal contact points in said first conductive layer;  
6 forming at least one signal path in said first conductive layer;  
7 forming an actuator in said first conductive layer for providing a force on a  
8 movable structure on a second substrate, wherein said movable structure  
9 includes at least one conductive contact area;  
10 forming at least one actuator drive line in said first conductive layer electrically  
11 connected to said actuator;  
12 forming at least one ground line in said first conductive layer;  
13 forming a first insulating layer on said first conductive layer;  
14 forming an insulating ring in said first insulating layer;  
15 forming a second conductive layer on said first insulating layer;  
16 forming a first conductive ring around said movable structure on said second  
17 substrate;  
18 forming a second conductive ring in said second conductive layer, the second  
19 conductive ring in said second conductive layer substantially aligned with  
20 and overlying said insulating ring, said second conductive ring in said  
21 second conductive layer also substantially aligned with and overlying said  
22 first conductive ring around said moving structure on said second  
23 substrate; and  
24 bonding said first substrate and said second substrate together forming a sealed  
25 cavity and thereby sealing said movable structure, wherein the at least one  
26 signal path runs from inside said cavity to outside said cavity at two  
27 locations, and said at least one signal path that runs from inside to outside  
28 said cavity is connected to said at least two signal contact points outside  
29 the cavity, said at least one actuator drive line and said at least one ground  
30 line running from inside the cavity to outside said cavity, each actuator  
31 drive line and each ground line being connected to at least one contact  
32 point outside said cavity.

1       28. (PREVIOUSLY ADDED) The method of making a lid assembly for a micro-  
2 switch of claim 27, wherein said at least one signal path connected to said at least two contact  
3 points further comprises:

4           a gap in said at least one signal path separating said at least one signal path into two  
5           electrically-disconnected portions; and  
6           in at least one state of electrical contact, said at least one conductive contact area of  
7           said movable structure electrically connecting said two electrically-  
8           disconnected portions.

1       29. (PREVIOUSLY ADDED) The method of making a lid assembly for a micro-  
2       switch of claim 27, wherein said micro-switch is a part of a device selected from the list of  
3       parts of a device consisting of: phase shifter, power amplifier, antenna, low-noise amplifier,  
4       filter, inductor, and variable capacitor.

1       30. (PREVIOUSLY ADDED) The method of making a lid assembly for a micro-  
2       switch of claim 27, further comprising bonding said first substrate and said second substrate  
3       together with a gold thermocompression bonding process.

1       31. (PREVIOUSLY ADDED) The method of making a lid assembly for a micro-  
2       switch of claim 30, wherein said gold thermocompression bonding process further comprises  
3       heatless bonding of said first substrate and said second substrate.

1       32. (CANCELED)

1       33. (CANCELED)

1       34. (CANCELED)

1       35. (CANCELED)

1       36. (CURRENTLY AMENDED) ~~The micro-switch of claim 1, A micro-switch,~~  
2 comprising:

3           a first substrate and a second substrate bonded together to form a cavity;  
4           on the first substrate, at least one signal path that runs from inside the cavity to  
5           outside the cavity at at least two locations; and  
6           at least one movable structure on the second substrate, said movable structure

comprising at least one conductive contact area, wherein at least one portion of said movable structure is inside said cavity, and the movable structure is moved in response to a force provided by an actuator, wherein a state of electrical contact of said micro-switch is changed by moving said movable structure, wherein said actuator is an electrostatic actuator.

37. (CANCELED)

38. (CURRENTLY AMENDED) ~~The micro-switch of claim 1, further comprising A~~  
micro-switch, comprising:  
a first substrate and a second substrate bonded together to form a cavity;  
on the first substrate, at least one signal path that runs from inside the cavity to  
outside the cavity at at least two locations;  
at least one movable structure on the second substrate, said movable structure  
comprising at least one conductive contact area, wherein at least one  
portion of said movable structure is inside said cavity, and the movable  
structure is moved in response to a force provided by an actuator, wherein  
a state of electrical contact of said micro-switch is changed by moving  
said movable structure, wherein said movable structure further comprises  
at least one layer of silicon, and at least one state of electrical contact of  
the micro-switch results from physical contact between said at least one  
conductive contact area and at least one portion of said first substrate; and  
at least one insulating layer that electrically insulates one of said at least one  
conductive contact area from said at least one layer of silicon, wherein  
said at least one signal path has at least one gap separating said at least one  
signal path into two electrically disconnected portions, and during said at  
least one state of electrical contact, said at least one conductive contact  
area electrically connects said two electrically disconnected portions of  
said at least one signal path.

39. (CANCELED)

40. (PREVIOUSLY ADDED) A micro-switch, comprising:

2       a first substrate with at least one signal path;  
3       a second substrate, wherein said first substrate and said second substrate are bonded  
4              together with gold thermocompression bonding;  
5       at least one seal ring that seals at least one hermetic cavity between said first substrate  
6              and said second substrate, wherein said at least one signal path runs from  
7              inside said hermetic cavity to outside said hermetic cavity at at least two  
8              locations, and said seal ring is comprised of gold;  
9       at least one movable structure with at least one conductive contact area within said  
10             cavity, wherein said at least one movable structure is moved in response to a  
11             force provided by an actuator, and a state of electrical contact of the micro-  
12             switch can be changed by moving said at least one movable structure; and  
13       means for powering said actuator.

1       41. (PREVIOUSLY ADDED) The micro-switch of claim 40, wherein said means for  
2       powering said actuator further comprises at least one actuator drive line and at least one  
3       ground line, wherein said at least one actuator drive line is electrically connected to said  
4       actuator and said at least one ground line is electrically connected to a common.

1       42. (PREVIOUSLY ADDED) The micro-switch of claim 40, further comprising:  
2       a gap in said at least one signal path that separates said at least one signal path into  
3              two electrically-disconnected portions; and  
4       in at least one state of electrical contact, said at least one conductive contact area of  
5              said movable structure electrically connecting said two electrically-  
6              disconnected portions  
7       at least one insulating layer on said movable structure, wherein said insulating layer  
8              electrically insulates said at least one conductive contact area of said  
9              movable structure from the rest of said movable structure; and  
10       in at least one state of electrical contact of said micro-switch, said at least one  
11              conductive contact area of said movable structure electrically connects said  
12              two electrically-disconnected portions of said signal path.

1       43. (PREVIOUSLY ADDED) The micro-switch of claim 40, wherein said gold  
2 thermocompression bonding process further comprises heatless bonding of said first  
3 substrate and said second substrate.

1       44. (PREVIOUSLY ADDED) The micro-switch of claim 40, wherein said seal ring  
2 is composed of low-outgassing materials.

1       45. (PREVIOUSLY ADDED) The micro-switch of claim 40, wherein said seal ring  
2 is composed of low-outgassing, inorganic, non-solder materials.

1       46. (PREVIOUSLY ADDED) The micro-switch of claim 40, wherein the electrical  
2 contact is selected from a list of electrical contacts consisting of: metal contact, capacitive,  
3 and shunt.

1       47. (PREVIOUSLY ADDED) The micro-switch of claim 40, wherein at least one of  
2 said first substrate and said second substrate has at least one deformable metal layer shaped  
3 into a seal ring before said gold thermocompression bonding.

1       48. (PREVIOUSLY ADDED) The micro-switch of claim 40, wherein said seal ring  
2 comprises metal layers deposited on said first substrate and said second substrate before  
3 bonding.

1       49. (PREVIOUSLY ADDED) The micro-switch of claim 40, wherein said movable  
2 structure is fabricated on said second substrate.

1       50. (PREVIOUSLY ADDED) The micro-switch of claim 40, wherein said movable  
2 structure is fabricated on said first substrate.

1       51. (PREVIOUSLY ADDED) The micro-switch of claim 40, wherein at least one  
2 signal path runs in and out of said cavity through at least one via.

1        52. (PREVIOUSLY ADDED) The micro-switch of claim 40, wherein at least one  
2 signal path runs in and out of said cavity at at least one location through at least one  
3 conductive layer deposited on said first substrate, wherein said at least one signal path is  
4 electrically isolated from at least one portion of said micro-switch with an insulating layer  
5 deposited on said first substrate.

1        53. (PREVIOUSLY ADDED) The micro-switch of claim 40, wherein said micro-  
2 switch is part of a device selected from the list of parts of a device consisting of: phase  
3 shifter, antenna, low-noise amplifier, power amplifier, and filter.

1        54. (PREVIOUSLY ADDED) The micro-switch of claim 40, wherein at least one  
2 signal path runs in and out of said cavity at at least one location through at least one  
3 conductive layer deposited on said second substrate, wherein said at least one signal path is  
4 electrically isolated from at least one portion of said micro-switch with an insulating layer  
5 deposited on said second substrate.

1        55. (PREVIOUSLY ADDED) The micro-switch of claim 40, wherein said at least  
2 one movable structure further comprises at least one layer of silicon.

1        56. (PREVIOUSLY ADDED) A micro-switch, comprising:  
2              a first substrate and a second substrate bonded together to form a cavity;  
3              at least one signal path on said first substrate that run from inside said cavity to  
4              outside said cavity in at least two locations;  
5              at least one movable structure on said second substrate within said cavity, wherein  
6              said at least one movable structure is moved in response to a force provided  
7              by an electrostatic actuator, and said at least one movable structure comprises  
8              at least one layer of silicon and at least one conductive contact area, wherein  
9              one state of electrical contact of said micro-switch results from physical  
10             contact between said at least one conductive contact area and at least one part  
11             of said first substrate; and  
12             means for driving said electrostatic actuator.

1        57. (PREVIOUSLY ADDED) The micro-switch of claim 56, wherein said at least  
2 one signal path has a gap that separates said at least one signal path into two electrically-  
3 disconnected portions, and in one state of electrical contact of said micro-switch, said at  
4 least one movable structure electrically connects said two electrically disconnected portions.

1        58. (PREVIOUSLY ADDED) The micro-switch of claim 56, wherein said means for  
2 driving said electrostatic actuator further comprises at least one actuator drive line and at  
3 least one ground line, wherein said at least one actuator drive line is electrically connected  
4 to said actuator and said at least one ground line is electrically connected to a ground, said at  
5 least one actuator drive line and said at least one ground line running from inside said cavity  
6 to outside said cavity.

1        59. (PREVIOUSLY ADDED) The micro-switch of claim 56, wherein said cavity is a  
2 hermetic cavity.

1        60. (PREVIOUSLY ADDED) The micro-switch of claim 57, further comprising an  
2 insulating layer that electrically insulates said at least one conductive contact area of said at  
3 least one movable structure from other portions of said at least one movable structure.

1        61. (PREVIOUSLY ADDED) The micro-switch of claim 56, wherein said at least  
2 one conductive contact area is electrically connected with said at least one signal path  
3 through at least one conductive structure bonded to said first substrate.

1        62. (PREVIOUSLY ADDED) The micro-switch of claim 56, wherein said first  
2 substrate and said second substrate are bonded by gold thermocompression bonding, said  
3 cavity being hermetically sealed with at least one seal ring, and said at least one seal ring  
4 comprising at least one layer that contains gold.

1        63. (PREVIOUSLY ADDED) The micro-switch of claim 56, wherein said first  
2 substrate and said second substrate are wafers.

1           64. (PREVIOUSLY ADDED) The micro-switch of claim 62, wherein said gold  
2 thermocompression bonding is performed below 400 degrees C during bonding.

1

1           65. (PREVIOUSLY ADDED) The micro-switch of claim 62, wherein said gold  
2 thermocompression bonding further comprises heatless bonding of said first substrate and  
3 said second substrate.